

Applicant: Adler-Golden et al.

For: Improved Methods for Atmospheric Correction of Hyperspectral Imagery Over Land

Abstract of the Disclosure

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This invention discloses several improved methods of correcting for atmospheric effects on a remote image of the Earth's surface taken from above, wherein the image comprises a number of simultaneously acquired images of the same scene, each including a large number of pixels, each at a different wavelength band, and including infrared through ultraviolet wavelengths. One method is for retrieving the aerosol/haze amount (i.e., visible range) from an assumed ratio of in-band reflectances, rather than from an assumed reflectance value. Another method is for identifying cloud-containing pixels. This is used to improve the calculation of the spatially averaged radiance L^*_e and reflectance ρ_e images in standard equations. Another method greatly reduces the number of mathematical operations required to generate the reflectance values. This method operates by averaging the water vapor and ρ_e values over small groups of neighboring pixels, so that the same A, B, S, L^*_a parameter values may also be assigned to all pixels within the group. Yet another new method accounts for shifts in the wavelength calibration within the image, such as would be caused by spectral "smile". This method loops the calculation of A, B, S and L^*_a over a set of possible wavelength shifts with respect to the input channel centers, and assigns the appropriate set of parameters to each pixel based on a pixel-location-dependent formula for the wavelength shift.

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